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# PATENT SPECIFICATION

788,520



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## COMPLETE SPECIFICATION

### Improvements in Laminated Electrical Insulation.

We, GENERAL ELECTRIC COMPANY, a Corporation of the State of New York, United States of America, having its office at Schenectady 5, State of New York, United States 5 of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to slot liners for dynamo-electric machines formed from laminated sheet electrical insulation material.

It is highly desirable that the dielectric strength of sheet electrical insulation for slot 15 liners be as high as possible, while the thickness thereof remains relatively small. In addition, it is desirable that the material have a high degree of toughness so that there will be no cut-through of the insulation 20 and consequent failure thereof. Furthermore, insulation to be used for slot liners should tend to adhere to and press against the material to be insulated, because it is important that there be no slipping of the insulation during or after assembly.

25 An object of this invention is to provide a slot liner of laminated insulation material which will incorporate the improved features set forth above.

30 According to the invention a U-shaped slot liner for a dynamo-electric machine comprises a lamina of paper bonded to a lamina of polyethylene terephthalate bonded, the paper lamina forming the outside of the 35 U-shaped liner and the polyethylene terephthalate lamina forming the inside of the U-shaped liner.

The invention will now be described with 40 reference to the accompanying drawings, wherein:—

Figure 1 is a fragmentary view in perspective, partly broken away and partly in cross-section, of a dynamoelectric machine core member having slots insulated with the 45 improved laminate of this invention;

(Price 3s. 6d.)

Price 4s 6d.

Figure 2 is a view in perspective, partly broken away, of a section of the improved laminate; and

Figure 3 is a view in perspective of a slot 50 insulator as shown in Figure 1, formed from the improved laminate of this invention.

In the drawings, core 1 of a dynamo-electric machine (not otherwise shown), is made up of a plurality of thin laminations 55 of magnetic material. A plurality of slots 3 are formed in core 1 and are adapted to

have windings (not shown for greater clarity) located therein. It is generally advisable to provide special insulation to insulate the windings from the core 1 to prevent shorting 60 therebetween. For this purpose, each slot 65 3 is provided with a slot insulator 4 shown in Figures 2 and 3, comprising a laminate made up of two laminae 5 and 6 bonded together by any suitable adhesive, e.g. one 70 having a rubber latex base. Lamina 5 is made up of a strip of polyethylene terephthalate while lamina 6 may be of any kind of paper having the requisite strength and insulation qualities, such as rag paper, 75 for instance.

Experimentation has shown that the insulating quality of a laminate of the two 80 laminae 5 and 6 is higher than the sum to be expected from the individual laminae 5 and 6. Thus, by combining the two into an integral laminated structure there is achieved a higher dielectric effect than by use of the laminae individually. Another unexpected 85 and unusual feature of this laminate discovered during experimentation is that the physical resistance to tearing of the laminate is higher than the sum of the physical resistances of the laminae. Thus, the combination of the two into an integral laminated structure provides, in addition to the 90 increase in dielectric strength, an unusually tough material and eliminates, to a considerable extent, tearing of the material when, for instance, windings are pressed down into

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slots 3. Another desirable feature resulting from the combination of laminae 5 and 6 into a single structure, particularly advantageous in a use for slot insulation in dynamo electric machines, is that the paper lamina 6 has a frictional relationship to the core 1 which tends to prevent it from sliding thereupon. This tendency is increased by the spring - like qualities of the polyethylene terephthalate lamina which, in its illustrated use, provides spring legs, as indicated at 7 and 8, which tend to force the paper lamina 6 against the core 1 and thereby increase the resistance to slippage. This resistance to slipping permits the slot insulators 4 to be formed without special slip - preventing means as has heretofore been the custom. This result is achieved by the combination of the friction properties of the paper and the spring properties of the polyethylene terephthalate.

While any desired combination of thicknesses of the laminae may be used, it has been found, in connection with the particular use for slot insulation in dynamo-electric machines, that a laminate approximately 10 mils in thickness, with each of the laminae being approximately 5 mils thick, will give excellent results in that flexibility, spring qualities, dielectric strength, and toughness of the laminate will all be present to the

desired degree.

The laminate may be made in any thickness desired, and the thicknesses of the separate laminae may be varied with respect to each other as desired. While the laminate has been shown in connection with a particular use, its insulating and toughness qualities make it suitable for use in a variety of instances where electrical insulation is needed, the invention not being restricted to the single example of use shown.

*What we claim is :*

1. A U-shaped slot liner for use in dynamo-electric machines and formed of a lamina of paper bonded to a lamina of polyethylene terephthalate, the paper lamina forming the outside of said U-shaped liner and the polyethylene terephthalate lamina forming the inside of the U-shaped liner. 50

2. A U-shaped slot liner as claimed in Claim 1, characterised in that the laminae are of substantially like thickness.

3. A U-shaped slot liner for dynamo-electric machines, substantially as herein set forth. 55

J. W. RIDDING,  
Chartered Patent Agent  
64-66, Coleman Street,  
London, E.C.2.  
Agent for the Applicant

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1 SHEET

This drawing is a reproduction of  
the Original on a reduced scale.

Fig. 1.

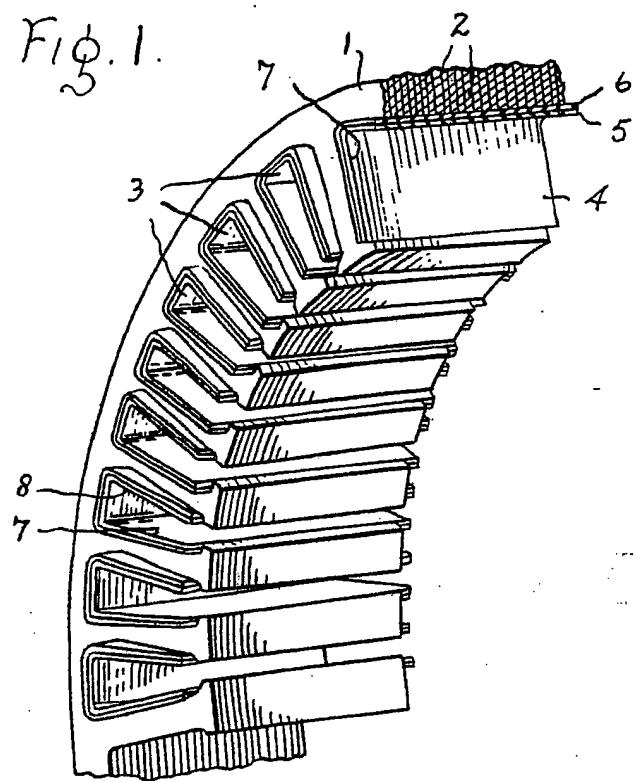
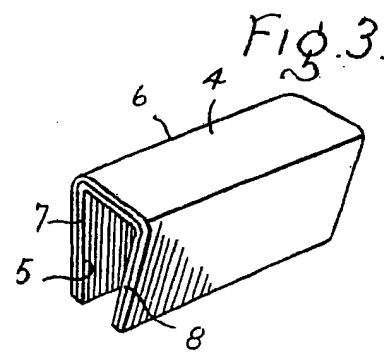
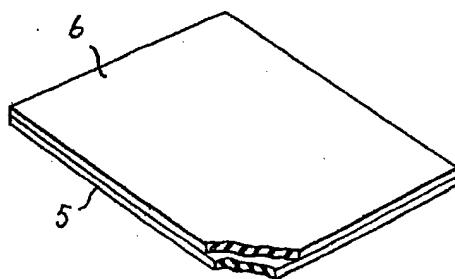


Fig. 2.



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